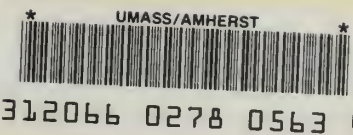


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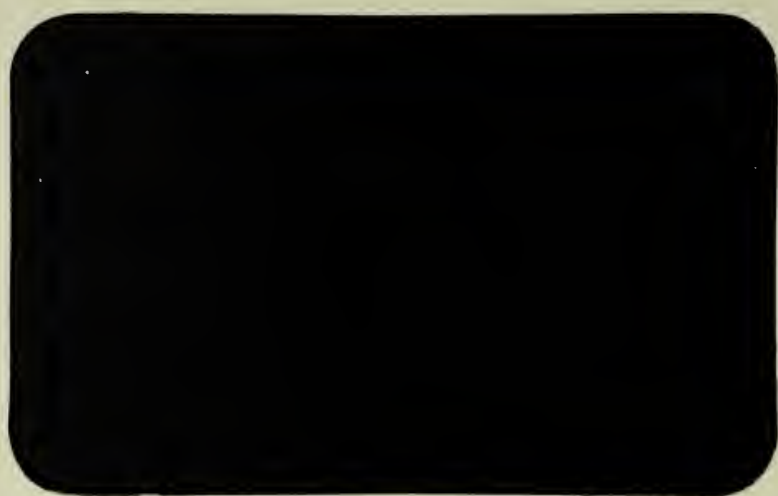
AN ANALYSIS OF THE
FABRICATED METALS INDUSTRY
MANUFACTURING IN MASSACHUSETTS
AND THE UNITED STATES
1970 - 1982

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Division of Employment Security

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Prepared By:
Massachusetts Division
of Employment Security
Research and Policy Dept.
September, 1984

THE FABRICATED METALS INDUSTRY IN MASSACHUSETTS
EXECUTIVE SUMMARY

• The fabricated metals industry is an important component of the Massachusetts manufacturing sector. Approximately 7.5 percent of total manufacturing employment or 47,500 jobs are located in fabricated metals.

• Geographically, the State's three largest labor market areas, Boston, Worcester and Springfield account for almost 75 percent of total industry employment.

• Establishments in this industry produce a diverse set of products that are tailored to a variety of markets. Among the major products are metals cans, tin ware, hand tools, cutlery, hardware, fabricated structural metal products, non-electrical heating and plumbing apparatus, ordnance and a variety of metal and wire products.

• Employment in fabricated metals is more concentrated in smaller establishments relative to total manufacturing. Within Massachusetts over 40 percent of all jobs in fabricated metals are in firms with fewer than 100 employees as compared to 27.1 percent for manufacturing as a whole.

• This industry provides many well paying jobs for skilled and semi-skilled machine craftsmen and operatives. Average hourly wages for production workers typically exceed the manufacturing wage by between 3 and 7 percent in Massachusetts.

• The fabricated metals industry has experienced serious employment problems similar to other mature industries in Massachusetts over recent years. Because many of the products manufactured in this sector are tied into cyclically sensitive industries such as construction, automobile production and machinery manufacturing, fabricated metals employment has been especially hard hit during economic downturns. Specifically, employment losses suffered during the 1970-1971, 1974-1975, and 1980-1982 recessionary periods were well in excess of the rate of overall job decline experienced by the entire Massachusetts economy.

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• The employment declines registered by the fabricated metals industry, especially since 1980 indicate that structural factors are also contributing to Massachusetts' deteriorating position. In particular, low levels of investment combined with increased overseas competition are likely to be the major forces behind the secular decline. The lower levels of investment result in both slower productivity growth and higher costs. These developments have made Massachusetts and U.S. manufacturers extremely susceptible to increased competition from overseas, particularly with regard to those goods that are characterized by a highly standardized production process. While Massachusetts manufacturers of specialized fabricated metal products have fared better, a continuation of inadequate levels of investment may also have an adverse impact on these firms in the near future.

• From a public policy perspective, it is important that strategies be developed that promote increased investment and improve our competitive position overseas. Three major questions which must be addressed are (1) to what extent should the Commonwealth's quasi-public and public capital funding sources be directed towards viable firms in the fabricated metals industry, for the purchasing of plant and equipment as well as the financing of intermediate and long term subordinated debt? (2) can small business, particularly those with financing needs of under \$250,000 obtain access to the quasi-public and public funding sources? and (3) what steps can the state take in promoting an export expansion into those markets, especially highly specialized product niches where Massachusetts fabricated metals manufacturers have a comparative advantage?

1. The first part of the book is devoted to a general discussion of the theory of the firm.

2. The second part of the book is devoted to a general discussion of the theory of the firm.

3. The third part of the book is devoted to a general discussion of the theory of the firm.

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FABRICATED METALS EMPLOYMENT AND WAGES

The data provided in Table 1 indicates that the fabricated metals industry in Massachusetts and the United States has experienced serious employment problems during the 1970 - 1982 period. The extent of these difficulties are illustrated by the fact that Massachusetts employment peaked ten years ago in 1974 at 57,200 jobs while in the United States employment reached its apex in 1979 at a level of 1,717,900 jobs. As of 1982 the respective employment figures were 47,500 and 1,442,600; these figures were 17 percent and 16 percent below the respective employment peaks for Massachusetts and the United States.

Given the strong connection of fabricated metals to such cyclically sensitive industries as construction, machinery manufacturers and durable goods producers, especially the automotive industry, the fact that employment trends move in concert with overall economic conditions is not surprising. As the data in Table 1 reveals both Massachusetts and the United States suffered sharp employment declines during the 70-71, 74-75, and 80-82 recessionary periods. Although the largest annual decrease occurred between 1974 and 1975, the cumulative decline of the industry was more pronounced during the 1980-82 period as employment fell by 13.8 percent in Massachusetts and 16.0 percent in the United States. Equally disturbing is that employment has fallen for 3 consecutive years at both the national and state level. The severity of the most recent downturn both in terms of magnitude and duration will make it extraordinarily difficult for the industry to return to its 1979 employment levels in both Massachusetts and the United States. It should be noted that more recent data which is preliminary indicates that fabricated metals employment in Massachusetts started to show a recovery beginning in the 3rd quarter of 1983.

Although fabricated metals is clearly very sensitive to business cycles, its employment levels do appear to lag slightly during both economic downturns and recoveries. When the economy begins to head downward into a recessionary trend, fabricated metals firms are apt to first reduce the average workweek before laying off workers. Conversely, during economic upturns employers are inclined to initially extend the average workweek before recalling workers from layoffs. This phenomena would explain in part, why the average workweek increased slightly for production workers during the brief and aborted 1980 recovery but was never translated into employment gains.

Unfortunately, the employment problems encountered by this industry cannot be attributed entirely to cyclical forces. While the 1976-1979 period represented the strongest surge of employment growth in the Massachusetts economy since WWII, this surge was unable to pull the fabricated metal industry back to its 1974 employment level. The United States experience, though not identical to Massachusetts, also appears to be undergoing structural changes as well, particularly since 1979. It would appear that serious difficulties encountered by the automotive industry and construction sector along with increased use of plastic alternatives for containers and fixtures are having an undesirable affect on this industry.

The notion that structural phenomena are impacting industry performance adversely is reinforced by changes in the share of manufacturing employment accounted for by fabricated metals. Since 1974, the share of manufacturing employment in Massachusetts held by fabricated metals has fallen steadily from 8.9 percent to 7.5 percent. Within the United States, little fluctuation occurred between 1973 and 1980 indicating that the strength or weakness of the industry coincided with the manufacturing sector. Between 1979 and 1982, however, the proportion of manufacturing employment fell from 8.2 percent to 7.6 percent. When comparing the Massachusetts and United States experiences it should be noted the 1981 marked the first time that Fabricated Metals

employment in the state comprised a smaller share of manufacturing employment relative to the nation.

From a Massachusetts perspective a more detailed review of the underlying structural problems would appear warranted in order to determine why the state's position has deteriorated more rapidly than the nation as a whole. It is evident that Massachusetts policymakers must pay close attention to the performance of Fabricated Metals during the current recovery. The extent to which this industry rebounds at both the state and national level will be of great assistance in identifying whether the most recent downturn accelerated an apparent structural decline or was merely reflective of adverse cyclical phenomena. By sorting through the magnitude of both cyclical and structural forces, specific strategies can then be developed to improve the health of this industry.

The importance of the Massachusetts fabricated metals industry as a source of well paying jobs is illustrated clearly by the average hourly wage data in Table 2. As the data indicates, average hourly wages for production workers continuously ranged between 3 percent and 7 percent above the overall manufacturing average at both the state and national level. In 1982, the average hourly wage of \$8.07 for production workers in fabricated metals was 6.5 percent above the manufacturing wage of \$7.58.

The above average hourly wages are in part a reflection of the occupational structure of fabricated metals. Approximately 20 percent of all workers in this industry are employed in skilled craft occupations such as sheet metal workers and tool and die makers; this compares favorably to the overall manufacturing average of 16.6 percent. Another 20 percent of employment is comprised of skilled and semi-skilled machine operatives such as machine tool operatives (including numerical control), lathe and milling machine operatives and welders.

Within Massachusetts, average hourly wages in fabricated metals rose faster than manufacturing between 1970-1982, increasing by 143.8 percent as compared to 134.7 percent. It should be noted, that this faster growth occurred primarily between 1970 and 1974 and that since 1974 wage gains in fabricated metals have paralleled the growth in manufacturing. It is significant, however, that in spite of the employment problems mentioned earlier, the industry has been able to maintain its relative wage advantage.

The wage experiences of both the fabricated metals industry and overall manufacturing in the United States has been somewhat different from their Massachusetts counterparts. Within fabricated metals, wages nationally have risen slightly faster relative to Massachusetts, while in manufacturing the disparity was more pronounced (150.9 percent vs. 134.7 percent). Unlike Massachusetts, however, the average hourly wage gains in fabricated metals lagged slightly behind manufacturing. When one examines the 1974-1982 period, the differential was more pronounced with wages nationally increasing by 75 percent in fabricated metals as compared to 88 percent in manufacturing.

The fact that the hourly wages of Massachusetts employers's in fabricated metals are consistently below the national average would appear to give state-wide firms a competitive advantage on the basis of lower labor costs. At the outset of the 1970-1982 period, fabricated metals hourly wages in the Commonwealth were 90.2 percent of the national average. By 1981, this wage gap had widened further, falling to 87.3 percent of the national figure. This development represents a further improvement in Massachusetts relative wage position. And yet despite this development, the Massachusetts fabricated metals industry fared worse than their national counterparts. As a result, the deteriorating employment picture within the Massachusetts fabricated metals industry relative to the nation cannot be attributed to unfavorable wage conditions.

Table 1
Fabricated Metal Employment
Massachusetts and United States, 1970-1982
(numbers in thousands)

<u>Year</u>	<u>Employment</u>	<u>Percent Change From Previous Year</u>	<u>Share of Mfg. Total</u>	<u>Employment</u>	<u>Percent Change From Previous Year</u>	<u>Share of Mfg. Total</u>
1970	53.5	--	8.3	1,560.0	--	8.1
1971	51.2	- 4.3	8.5	1,480.1	- 5.1	7.9
1972	52.2	+ 2.0	8.6	1,546.7	+ 4.5	8.1
1973	56.1	- 7.5	8.8	1,651.1	+ 6.7	8.2
1974	57.2	- 2.0	8.9	1,638.5	- 0.8	8.2
1975	49.2	-14.0	8.5	1,458.3	-11.0	8.0
1976	50.4	+ 2.4	8.5	1,510.9	+ 3.6	8.0
1977	51.8	+ 2.8	8.3	1,582.8	+ 4.8	8.0
1978	53.2	+ 2.7	8.2	1,672.6	+ 5.7	8.2
1979	55.1	+ 3.6	8.2	1,717.9	+ 2.7	8.2
1980	53.4	- 3.1	7.9	1,609.0	- 6.3	7.9
1981	51.5	- 3.6	7.7	1,583.6	- 1.6	7.8
1982	47.5	- 8.2	7.5	1,442.6	- 8.9	7.6

Sources: U.S. Employment 1970-1981 E & T Report of President, 1982

U.S. Employment 1982 - Employment and Earnings, March 1983

Current Employment Statistics Program - BLS-790 Mass. DES

Table 2
Average Hourly Wages of Production Workers
In Fabricated Metals and Manufacturing
Massachusetts and the United States
1970-1982

<u>Year</u>	<u>Ave. Hourly Wage-Fab. Metal Massachusetts</u>	<u>Ave. Hourly Wage-Fab. Metal United States</u>	<u>Mass. --- U. S.</u>	<u>Ave. Hourly Wage-Mfg. Massachusetts</u>	<u>Ave. Hourly Wage-Mfg. U. S.</u>
1970	\$3.31	\$3.64	90.0	\$3.23	\$3.46
1971	3.54	3.92	90.3	3.42	3.70
1972	3.75	4.20	89.3	3.65	3.98
1973	4.00	4.42	90.5	3.89	4.24
1974	4.44	4.84	91.7	4.16	4.68
1975	4.77	5.29	90.2	4.48	5.03
1976	4.97	5.71	87.0	4.79	5.46
1977	5.41	6.12	88.4	5.13	5.93
1978	5.83	6.64	87.8	5.53	6.48
1979	6.33	7.15	88.5	5.98	6.98
1980	6.89	7.87	87.5	6.51	7.70
1981	7.45	8.53	87.3	7.01	8.27
1982	8.07	8.96	90.1	7.58	8.68
70-1982 Absolute Change	\$4.76	\$5.32		\$4.35	\$ 5.22
70-1982 Percent Change	143.8%	146.2%		134.7%	150.9%

THE STRUCTURE OF THE FABRICATED METALS INDUSTRY IN MASSACHUSETTS

A comparison of the employment distribution by establishment size for Massachusetts manufacturing and fabricated metals industries identifies important structural differences. While the fabricated metals employment distribution is quite similar to the overall economy, it differs markedly from the manufacturing sector. Slightly more than 40 percent of all fabricated metals employment occurs in establishments with fewer than 100 employees as compared to 27 percent for manufacturing as a whole. Conversely 41 percent of all manufacturing employment resides in establishments of at least 500 employees as compared to 28 percent for Fabricated Metals. (see Table 3)

Obviously those factors which adversely affect smaller businesses will have a disproportionate impact on the health of the fabricated metals industry. The cyclical phenomena cited earlier, especially when combined with high interest rates place a heavy burden on the ability of smaller establishments to maintain an adequate cash flow during economic downturns. In addition, the low level of capital investment has also been a major problem in the metal working industry.^{1/} Between 1958 and 1980 capital expenditures in metal working industries which includes the bulk of fabricated metals, increased by approximately one-half the rate of total investment in all manufacturing industries. The results of this disparity in the level of investment resulted in an average rate of growth of productivity of only 1.1 percent a year between 1958 and 1980 compared to 2.8 percent for all of manufacturing.

This low level of investment has created a number of other structural problems since an aging capital stock also contributes to rising costs and threats from foreign imports.^{2/} While domestic firms in the metal working

industries have been able to compete effectively with those markets that emphasize highly customized orders they have suffered in those markets which are less specialized and prone to larger production volume. The Japanese in particular, have demonstrated the capacity of capturing larger shares of such high volume markets. These markets are especially dependent on adequate levels of investment in order to maintain high production levels at maximum efficiency. As one industry analyst noted however, "the purchase of even one machine strains the finances of large firms and may be beyond reach of many medium and small sized firms"^{3/} Thus the structural difficulties pertaining to the limited investment occurring in this industry is compounded by the preponderance of small and medium sized firms.

From a policy perspective it is clear that strategies must be developed that can promote an increased level of investment in the industry with special attention paid to the problems of small business. Although a number of private, quasi-public, and public sources of capital exist with the Commonwealth these funds frequently do not reach small business or mature industries such as Fabricated Metals. As the draft report of the Governor's Task Force on Mature Industries noted, the acceleration in the availability of private venture capital since 1977 has benefitted almost exclusively the high technology sector.^{4/}

Similarly, the quasi-public Massachusetts Technology Development Corporation (MTDC) is also limited to technology related companies. At the same time, quasi-public and public funds such as those provided by the Massachusetts Industrial Finance Corporation (MIFC), Massachusetts Capital Resource Corporation (MCRC), Small Business Association and Community Development Block Grants (CDBG) have served the small business and non-high technology communities through long-term and tax exempt plant and equipment financing as well as intermediated and long-term subordinated debt.^{5/}

Despite the host of programs available to provide available capital, several problems which appear especially germane to the fabricated metals industry were identified. In particular, those small businesses with financing needs of under \$250,000 appear to have received very limited assistance. In addition, lack of information pertaining to the availability of such resources and eligibility requirements that at times may be viewed as too restrictive have also posed problems. Strategies must be developed to ensure that capital be made available for financing the needs of not only high technology firms but also to viable enterprises in mature industries, including those dominated by smaller business such as fabricated metals.

A second major issue which policymakers must address pertains to the maintenance and expansion of markets for manufacturers of fabricated metals products. Because these products are utilized as both inputs and final products identifying the spectrum of domestic and international markets is a complex task. At the same time, an identification of some broad parameters would at least represent a start in the development of any feasible marketing strategies.

As noted earlier, foreign competitors have been most successful in penetrating those markets in the metal machine sector (of which fabricated metals is an integral part) that have very standardized production processes and orders typically of large volume. If United States and Massachusetts manufacturers are to prevent further loss of market share, increased levels of investment will be required. Strategies capable of encouraging investment combined with increased marketing efforts both domestically and overseas, may assist Massachusetts firms in at least maintaining their current share of standardized metal product markets.

In recent years, United States and Massachusetts manufacturers in metal machine industries have been more successful in competing in those markets that are sensitive to customer specifications and quality rather than

price. Because orders are frequently low volume and highly specialized these markets are often characterized by the dominance of small business. The need for appropriate levels of investment has been discussed throughout the paper and is certainly relevant to this segment of the fabricated metals industry as well. In addition, firms involved with highly specialized orders may have a greater likelihood of tapping into newer markets, be they geographical or user oriented. Unfortunately, as is the case with investment, these firms, especially small establishments, do not have the luxury of time or resources to engage in the effective marketing of their products. Any steps which could be taken by state policymakers to increase the access of Massachusetts firms to these specialized markets both domestically and overseas are bound to have a positive impact on the existing employment base of the fabricated metals industry.

As the data in Table 4 indicates, the composition of the Massachusetts fabricated metals industry is characterized by several key differences relative to the United States. It would appear that a review of these differences can help explain at least in part, the different paths that the Massachusetts and U.S. fabricated metal industries have traveled.

To begin with, cutlery and hand tools is much more important to the Massachusetts fabricated metals industry. Within the Commonwealth, it is the most dominant industry group, comprising 22 percent of total fabricated metals employment. By contrast, this industry group accounts for less than 10 percent of fabricated metals employment nationally. Since 1975, employment in cutlery and hand tools has fallen by over 2,000 jobs. It is evident that a major contributor to the over all decline in the Massachusetts fabricated metals industry can be tied directly to the unhealthy performance of its largest industry group. Further inquiry will be necessary in order to determine why cutlery and hand tools has fared so poorly.

Another major difference in the structure of fabricated metals employment pertains to the importance of structural metal products. Although it is the second largest industry group in Massachusetts and accounts for 18 percent of employment in fabricated metals, it is by far the most dominant industry group nationally, representing nearly one-third (32.0 percent) of total industry employment. As mentioned earlier, this industry group is characterized by a number of factors, particularly its dependence on construction activity and motor vehicles which make it extraordinarily sensitive to cyclical fluctuations. At the same time, markets tend to be very local which would account for the fact that Massachusetts share in this industry is much lower given its negligible amount of automotive employment and below average share of construction activity. It would appear that this industry group exhibits much more cyclical volatility nationally than it does in Massachusetts. This would explain at least in part why employment nationally rose more rapidly in 3 of the 4 years, between 1976 and 1979 and experienced sharper declines in two of the three years, between 1979 and 1982.

The notion of greater cyclical sensitivity nationally is reinforced by a review of the remaining industry groups. With the exception of miscellaneous metal services, all of those industry groups which account for greater shares of employment in the United States relative to Massachusetts are more susceptible to cyclical phenomena. These industries which include metal forgings and stampings, screw machine products and plumbing and heating are critically dependent on a number of cyclical factors which include construction activity, investment in capital machinery and automotive sales. By contrast, the one other industry group that is more important to Massachusetts than it is to the United States is ordnance and accessories. This industry group however, is very dependent on noncyclical factors such as orders from the Defense Department and state and local police departments.

**TABLE THREE
SIZE CLASS DISTRIBUTION OF EMPLOYMENT IN MANUFACTURING
AND FABRICATED METALS ESTABLISHMENTS
MARCH 1983**

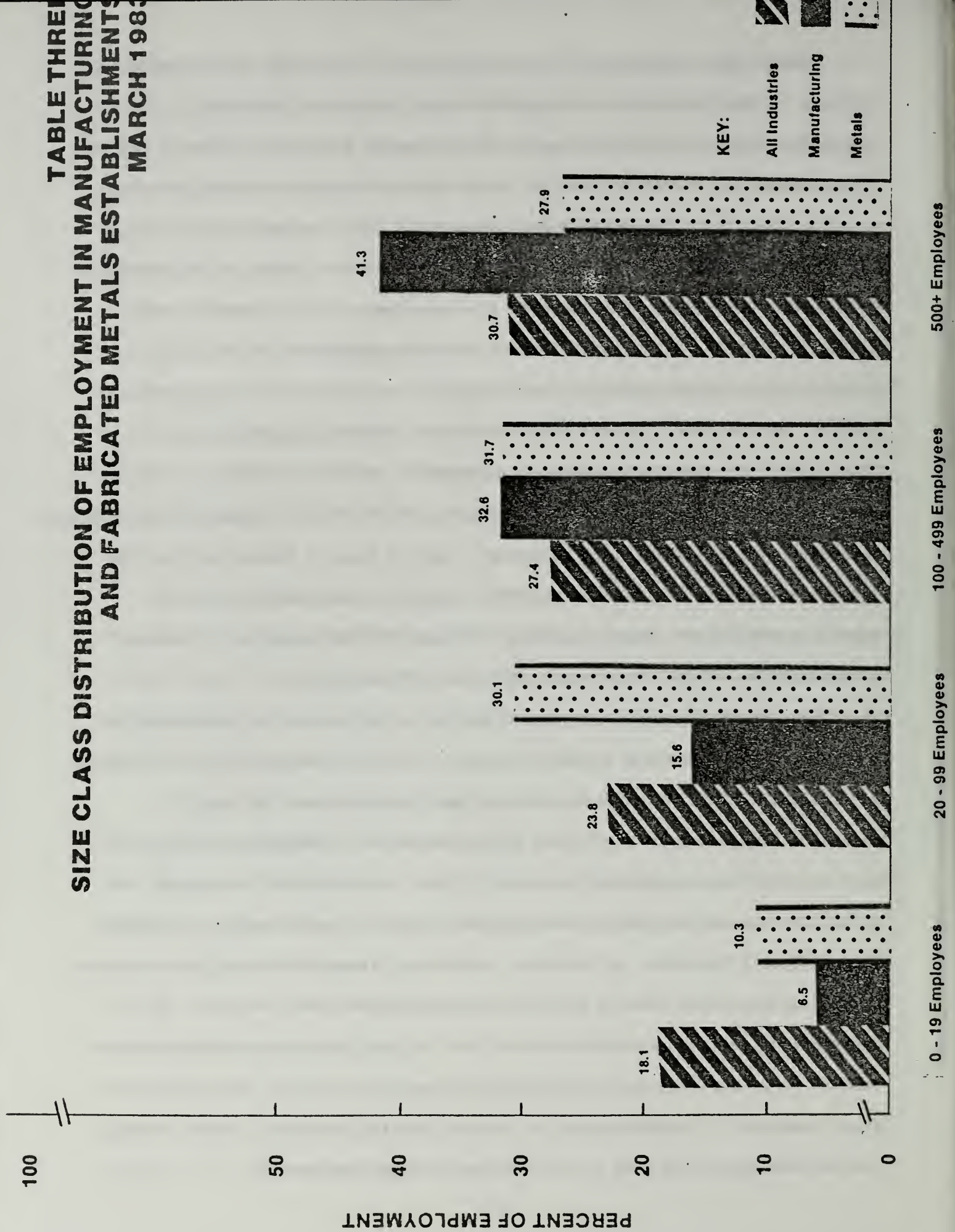


Table 4
 Fabricated Metals Employment by Industry Group
 Massachusetts and the United States
 1982
 (numbers in thousands)

SIC Code	Industry Group	Massachusetts Employment	Percent of Fabricated Metals Total	U.S. Employment	Percent of Fabricated Metals Total
341	Metal Cans and Containers	.9	1.9	66.6	4.6
342	Cutlery, Hand Tools and Hardware	10.3	21.6	137.4	9.5
343	Plumbing and Heating	1.4	2.9	66.3	4.6
344	Structural Metal Products	8.7	18.3	462.2	32.0
345	Screw Machine Products, Bolts	2.7	5.7	91.8	6.4
346	Metal Forgings and Stampings	5.8	12.2	225.0	15.6
347	Metal Services, Miscellaneous	4.1	8.6	93.3	6.5
348	Ordinance and Accessories	5.2	10.9	71.4	4.9
349	Miscellaneous Fabricated Metal Products	8.5	17.9	228.7	15.9
34	<u>Total Fabricated Metal</u>	47.6	100.0	1442.6	100.0

Source: ES 202, Employment and Wages and Contributions Report
 Massachusetts Division of Employment Security

Employment and Earnings - March 1983 - U.S. Department of Labor
 Bureau of Labor Statistics.

EMPLOYMENT IN THE FABRICATED METALS INDUSTRY
BY LABOR MARKET AREA WITHIN MASSACHUSETTS

Within Massachusetts, five labor market areas: Boston, Springfield - Chicopee-Holyoke, Worcester, the Massachusetts portion of Providence - Pawtucket and New Bedford account for 82.7 percent of total fabricated metals employment. As Table Five reveals, 40 percent of the industry's employment statewide is located in the Boston LMA, with another 36 percent residing in Springfield (18.6 percent) and Worcester (17.3 percent). Among these 5 labor market areas, only New Bedford registered employment gains in the fabricated metals industry between 1978 and 1982.

The importance of fabricated metals to a local labor market can be illustrated by the share of total manufacturing employment accounted for by this industry. While Fabricated Metals constitutes 7.5 percent of all manufacturing jobs in Massachusetts, 5 LMA's have relative shares which exceed 10 percent. The third largest LMA, Worcester finds almost one of every five manufacturing jobs (18.8 percent) located in fabricated metals. The Gardner LMA, though much smaller than Worcester, also finds close to 20 percent (18.3 percent) of its manufacturing jobs in this industry. The second largest LMA, Springfield possesses a concentration of Fabricated Metals employment that is almost double the state average (14.4 percent vs. 7.5 percent), while the Massachusetts portion of Providence-Pawtucket has 11.6 percent of its manufacturing sector comprised of jobs in fabricated metals. Finally, there is one other small LMA, Southbridge, in which Fabricated Metals is a critical component of the local manufacturing base and represents 13.6 percent of all manufacturing jobs. The poor performance of fabricated metals between 1978-1982 is reinforced by the fact that of these 5 LMA's, only the Gardner LMA experienced any employment growth during the period.

As Table Six indicates the distribution of employment by industry group varies markedly by LMA. For example, ordnance is not a major employer in two of the Commonwealth's three largest LMA's, Boston and Worcester. By contrast, it represents over one-third of fabricated metals employment in both Springfield (35.8 percent) and Gardner (38.1 percent) and nearly two-thirds of industry employment in New Bedford (64.5 percent). In fact, 60 percent of statewide employment in ordnance resides in the Springfield LMA. Similarly, miscellaneous fabricated metals accounts for almost one-third of the industry's jobs in Worcester (31.3 percent) and nearly one-half of industry employment in the Massachusetts portion of Providence-Pawtucket (44.4 percent) and Gardner (48.4 percent). The State's largest industry group, cutlery and hand tools comprises one-third of fabricated metals employment in Boston and 16.8 percent in Springfield. In addition, 70 percent of fabricated metals employment in Southbridge resides in this industry. Finally, the impact of structural metal products, the State's second largest group is concentrated in Boston (22.8 percent) and Southbridge (28.1 percent).

From another perspective, fabricated metals employment at the local level tends to be dominated by two or three major industry groups. As the data in Table Six illustrates, the top two industry groups in Southbridge and Gardner account for 98.1 percent and 86.5 percent of total industry employment. Similarly, the three largest industry groups comprise over 90 percent of fabricated metal employment in New Bedford and the Massachusetts portion of Providence-Pawtucket and nearly 75 percent of Boston's. Although employment was somewhat more diffuse in Worcester and Springfield, the dominance of miscellaneous fabricated metals and metal forgings in the former and ordnance in the latter is also evident. Thus, the performance of the fabricated metals industry in all major LMA's is tied directly to two or at most three industry groups.

Table 5
Major Centers of Fabricated Metals Employment

1. The five Labor Market Areas with the largest share of employment in Fabricated Metals in 1982.

<u>Labor Market Area</u>	<u>Employment</u>	<u>Share of Total Manufacturing</u>
-Boston	18,299	38.2
-Springfield-Chicopee-Holyoke	8,909	18.6
-Worcester	8,288	17.3
-Mass. Portion of Providence	2,197	4.6
-New Bedford	1,933	4.0
Total	40,991	82.7

2. The Five Labor Market Areas for which Fabricated Metals exceeds 10 percent of Total Manufacturing.

<u>Labor Market Area</u>	<u>Employment</u>	<u>Share of Total Manufacturing</u>
-Massachusetts	47,852	7.5
-Worcester	8,288	18.8
-Gardner	1,011	18.3
-Springfield-Chicopee-Holyoke	8,909	14.4
-Southbridge	775	13.6
-Mass. Portion of Rhode Island	2,197	11.4

Table 6
Share of Fabricated Metals Employment
Accounted for by Specific Industry Groups
In Selected Labor Market Areas

SIC Code		Mass. Portion of						
		Boston	Springfield Chicopee Holyoke	Worcester	New Bedford	Providence	Gardner	Southbridge
341	Metal Cans and Containers	--	--	*	*	*	*	*
342	Cutlery and Hand Tools	33.1	16.8	10.3	11.0	--	--	70.2
343	Plumbing and Heating Apparatus	--	--	6.2	--	*	*	*
344	Structural Metal Products	22.8	10.0	9.5	--	--	--	28.1
345	Screw Products	6.0	--	10.0	15.2	5.1	8.4	--
346	Metal Forgings and Stampings			28.6	*	22.0	--	*
347	Coating and Engraving	9.6	8.2	--	--	23.9	*	*
348	Ordnance	--	35.8	*	64.5	*	38.1	*
349	Miscellaneous Fabricated Metal Products	17.3	6.6	31.3	--	44.4	48.4	--
	<u>Subtotals</u>	88.8	90.3	95.9	90.7	95.4	94.9	98.1

-- Industry represents less than 5.0% of total fabricated metals employment in the LMA.

* No industry employment in this LMA

FOOTNOTES

1. Harrington Paul, Mansfield Luci, and Sum, Andrew: Cyclical Instability and Labor Shortages in Metalworking and Industries in Massachusetts. Center for Labor Market Studies, Northeastern University, Boston, MA, and Duke, John and Branld, Hurst: Cyclical Behavior of Productivity in the Machine Tool Industry. Monthly Labor Review, November 1981
2. Op Cit. - Harrington et Al.
3. Marx, Thomas G. "Technological Change and the Structure of the Machine Tool Industry" MSV Business Topics, Winter 1976.
4. See: Report of the Governor's Commission - The Future of Mature Industries - March 1, 1984 Draft.
5. Op Cit. - Mature Industries.



